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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,849	07/28/2006	Toshiaki Shimada	293723US40PCT	9845
22850 7590 04/08/2010 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER KNUTSON, JACOB D				
ART UNIT 3611		PAPER NUMBER		
NOTIFICATION DATE 04/08/2010		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/587,849

Applicant(s)

SHIMADA ET AL.

Examiner

JACOB KNUTSON

Art Unit

3611

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/1/10.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,5,7-10,12,13,15-18 and 20-26 is/are pending in the application.
- 4a) Of the above claim(s) 3,6,11,14 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2,4-6,7-10,12-13,15-18,20-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims **1, 2, 4 - 5, 7 and 20** are rejected under 35 U.S.C. 102(b) as being **anticipated** by **Hardgrove et al. (US 5,407,092)**.

For claim 1, Hardgrove et al. discloses a pressure vessel liner comprising a tubular trunk 6 having end openings at opposite ends of the trunk; the trunk having a plurality of head plates joined to the trunk at the opposite ends and closing the end openings of the trunk, respectively as shown in Fig. 1 and stated in column 4, lines 23 – 26; and a reinforcing member 9, 11 and 21 fixedly provided in an interior space formed by the trunk and the head plates and dividing the interior of space into a plurality of spaces (24 and the interior of the reinforcing member), wherein the head plates are joined to the reinforcing member as shown in Fig. 1, at least one of the head plates is in the form of an outwardly bulging dome, and of the reinforcing member has an end portion which adjacent to the domelike head plate projects beyond the trunk and is fitted to the form of the outwardly bulging dome of the at least one of the head plates as shown in Fig. 1.

For claim 2, Hardgrove et al. discloses the pressure vessel liner wherein the combined length of joints 20 between each of the head plates and the reinforcing member is at least 60% of

the combined length of portions of the reinforcing member in contact with an inner surface of the head plate as shown in Fig. 1.

For claim 4, Hardgrove et al. discloses the pressure vessel liner wherein the head plates are formed separately from the trunk and are joined respectively to opposite ends of the trunk as shown in Fig. 1.

For claim 5, Hardgrove et al. discloses the pressure vessel liner wherein one of the head plates is formed integrally with one end of the trunk and the other head plate is formed separately from the tank and joined to the other end of the trunk as stated in column 4, lines 23 – 26.

For claim 7, Hardgrove et al. discloses the pressure vessel liner wherein one of the head plates has a flat inner surface as shown in Fig. 1.

For claim 20, Hardgrove et al. discloses the pressure vessel comprising a pressure vessel liner which is covered with a fiber reinforced resin layer 7 over an outer peripheral surface thereof as stated in column 4, lines 39 – 47.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims **8 – 9, 12, 15 and 18 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Hardgrove et al. (US 5,407,092)** in view of **Blair et al. (US 6,095,367)** and **Klotz et al. (US 6,517,614 B1)**.

For claim 8, Hardgrove et al. discloses a process for fabricating a pressure vessel liner comprising extruding a tubular trunk 6 having open ends at opposite ends; forming two head plates at least one which is in the form of an outwardly bulging dome as stated in column 4, lines 23 – 23 and shown in Fig. 1, the head plates being configured to be joined to the trunk at the opposite ends and close the open ends of the trunk, respectively as shown in Fig. 1; a reinforcing member 9, 11, and 21 configured to divide an interior space formed by the trunk and the head plates into a plurality of spaces (24 and the interior of the reinforcing member), the reinforcing member having an end portion which is configured to project beyond the trunk and is fitted to the form of the outwardly bulging dome as shown in Fig. 1; inserting the reinforcing member into the trunk such that the end portion of the reinforcing member projects beyond the trunk, and is fitted to the form of the outwardly bulging dome of the at least one of the head plates; joining the trunk to the reinforcing member joining the two head plates respectively to the opposite ends of the trunk as shown in Fig. 1; and joining the two head plates to the reinforcing member. Hardgrove et al. does not explicitly express the reinforcing member to be extruded or the joining the head plates to the reinforcing member by friction agitation. However, Blair et al. does disclose tubular trunks 12 (cells) formed by extruding in column 9, lines 23 - 25, where the trunk is being extruding this also forms the head plates. It is well known in the art the ability to extrude tubular structures along with internal structures that will be inserted into the tubular structure to create a specific shape. Klotz et al. discloses synthetic resin housing parts bonded by

friction welding as stated in claim 5. It is well known in the art the ability to bond structures together to create a specific shape.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of extruding of Blair et al. with the apparatus of Hardgrove et al. to allow for creating a specific shape to increase compact-ability or create a more aesthetic appeal.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of bonding of Klotz et al. with the apparatus of Hardgrove et al. to allow for creating a specific shape to increase the integrity of the overall structure.

For claim 9, Hardgrove et al. modified as above discloses the process for fabricating a pressure vessel liner wherein the trunk is joined to the reinforcing member by friction agitation from outside the trunk.

For claim 12, Hardgrove et al. discloses a process for fabricating a pressure vessel liner comprising extruding a tubular trunk having open ends at opposite ends and a reinforcing member extending dividing an interior space of the trunk into a plurality of spaces in the form of an integral assembly, the reinforcing member having an end portion projecting beyond the trunk and configured to be fitted to the form of an outwardly bulging dome of at least one of head plates configured to be joined to the trunk at the opposite ends and close the open ends of the trunk, respectively; forming two head plates at least one of which is in the form of the outwardly bulging dome, the head plates being configured to be joined to the trunk at the opposite ends and close the open ends of the trunk, respectively; joining the two head plates respectively to the opposite ends of the trunk such that the wherein at least one of the head plates is in the form of an dome, an end portion of the reinforcing member adjacent to is fitted to the form of the

outwardly bulging dome of the at least one of the head plates; and joining the two head plates to the reinforcing member. Hardgrove et al. does not explicitly express the reinforcing member to be extruded or the joining the head plates to the reinforcing member by friction agitation. However, Blair et al. does disclose tubular trunks **12** (cells) formed by extruding in column **9**, lines **23 - 25**, where the trunk is being extruding this also forms the head plates. It is well known in the art the ability to extrude tubular structures along with internal structures that will be inserted into the tubular structure to create a specific shape. Klotz et al. discloses synthetic resin housing parts bonded by friction welding as stated in claim 5. It is well known in the art the ability to bond structures together to create a specific shape.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of extruding of Blair et al. with the apparatus of Hardgrove et al. to allow for creating a specific shape to increase compact-ability or create a more aesthetic appeal.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of bonding of Klotz et al. with the apparatus of Hardgrove et al. to allow for creating a specific shape to increase the integrity of the overall structure.

For claim **15**, Hardgrove et al. discloses a process for fabricating a pressure vessel liner including comprising forming a tubular trunk having open ends at opposite ends and a head plate closing one of the open ends of the trunk by forging in the form of an integral assembly forming a head plate configured to close the other open end of the trunk, at least one of the head plates in the form of an outwardly bulging dome, extruding a reinforcing member configured to divide an interior space formed by the trunk and the head plates into a plurality of spaces, the reinforcing member having an end portion which is configured to project beyond the trunk and is fitted to

the form of the outwardly bulging dome; inserting the reinforcing member into the trunk such that the end portion of the reinforcing member projects outward beyond the trunk, of the member and is fitted to the form of the outwardly bulging dome of the at least one of the head plates; joining the trunk to the reinforcing member joining the head plate formed separately from the trunk to the other end of the trunk and joining the two head plates to the reinforcing member. Hardgrove et al. does not explicitly express the reinforcing member to be extruded or the joining the head plates to the reinforcing member by friction agitation. However, Blair et al. does disclose tubular trunks 12 (cells) formed by extruding in column 9, lines 23 - 25, where the trunk is being extruding this also forms the head plates. It is well known in the art the ability to extrude tubular structures along with internal structures that will be inserted into the tubular structure to create a specific shape. Klotz et al. discloses synthetic resin housing parts bonded by friction welding as stated in claim 5. It is well known in the art the ability to bond structures together to create a specific shape.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of extruding of Blair et al. with the apparatus of Hardgrove et al. to allow for creating a specific shape to increase compact-ability or create a more aesthetic appeal.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of bonding of Klotz et al. with the apparatus of Hardgrove et al. to allow for creating a specific shape to increase the integrity of the overall structure.

For claim 18, Hardgrove et al. modified as above discloses the process for fabricating a pressure vessel liner wherein the trunk is joined to the reinforcing member by friction agitation from outside the trunk.

3. Claims **10, 13, 16 and 17 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Hardgrove et al. (US 5,407,092)** in view of **Blair et al. (US 6,095,367)** and **Klotz et al. (US 6,517,614 B1)** and further in view of **Taylor (US 7,093,337 B1)**.

For claim **10**, Hardgrove et al. does not disclose the process for fabricating a pressure vessel liner wherein one of the head plates is formed and an outwardly extending projection is formed on an outer surface of said one head plate integrally therewith when said one head plate is formed by forging, and which includes providing a mouthpiece portion **3** by forming a through bore extending from an outer end face of the projection to an inner surface of said one head plate after joining the two head plates respectively to the opposite ends of the trunk and joining the two head plates to the reinforcing member. However, Taylor discloses that all of the components of his apparatus may be formed by forging.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of forging of Taylor with the apparatus of Hardgrove et al. to allow for the closing of porosity, weld cracks and no sand inclusions which improve the integrity of the apparatus structure.

For claim **13**, Hardgrove et al. does not disclose the process for fabricating a pressure vessel liner according to claim 12 wherein one of the head plates is formed by forging and an outwardly extending projection is formed on an outer surface of said one head plate integrally therewith when said one head plate is formed by forging, and which includes providing a mouthpiece portion **3** by forming a through bore extending from an outer end face of the projection to an inner surface of said one head plate after joining the two head plates respectively

to the opposite ends of the trunk and joining the two head plates to the reinforcing member.

However, Taylor discloses that all of the components of his apparatus may be formed by forging.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of forging of Taylor with the apparatus of Hardgrove et al. to allow for the closing of porosity, weld cracks and no sand inclusions which improve the integrity of the apparatus structure.

For claim 16, Hardgrove et al. does not disclose the process for fabricating a pressure vessel liner wherein when the integral assembly of the trunk and the head plate is formed by forging, an outwardly extending projection is formed on an outer surface of the head plate integrally therewith, and which includes providing a mouthpiece portion 3 by forming a through bore extending from an outer end face of the projection to an inner surface of the head plate after joining the head plate formed separately from the trunk to the other end of the trunk and joining the two head plates to the reinforcing member. However, Taylor discloses that all of the components of his apparatus may be formed by forging.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of forging of Taylor with the apparatus of Hardgrove et al. to allow for the closing of porosity, weld cracks and no sand inclusions which improve the integrity of the apparatus structure.

For claim 17, Hardgrove et al. does not disclose the process for fabricating a pressure vessel liner wherein the head plate for closing the other open end of the trunk is formed by forging, and an outwardly extending projection is integrally formed on an outer surface of the head plate to be formed by forging, and which includes providing a mouthpiece portion 3 by

forming a through bore extending from an outer end face of the projection to an inner surface of the head plate after joining the head plate formed separately from the trunk to the other end of the trunk and joining the two head plates to the reinforcing member. However, Taylor discloses that all of the components of his apparatus may be formed by forging.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the method of forging of Taylor with the apparatus of Hardgrove et al. to allow for the closing of porosity, weld cracks and no sand inclusions which improve the integrity of the apparatus structure.

4. Claims **21 and 22 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Hardgrove et al. (US 5,407,092)** in view of **Klenk et al. (US 2004/0038094 A1)**.

For claim 21, Hardgrove et al. modified as above does not disclose the fuel cell system comprising a fuel hydrogen pressure vessel, a fuel cell and pressure piping for delivering fuel hydrogen gas from the pressure vessel to the fuel cell therethrough, the fuel hydrogen pressure vessel comprising a pressure vessel according to claim 20. Klenk et al. does disclose a fuel cell system comprising a fuel hydrogen pressure vessel 10 (reformer), a fuel cell (as stated in page 2, paragraph [0029], lines 8 - 14) and pressure piping 8 and 9 (inlet and outlet pipe) for delivering fuel hydrogen gas from the pressure vessel to the fuel cell therethrough, the fuel hydrogen pressure vessel comprising a pressure vessel according to claim 20.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the fuel hydrogen pressure vessel along with a fuel cell and pressure piping of Klenk et al. with the apparatus of Kobayashi to allow for use of fuel cell power to have two power sources which help create an alternative means for power.

For claim 22, Kobayashi modified as above discloses the fuel cell motor vehicle having installed therein a fuel cell system according to claim 21 as stated in claim 10 of Klenk et al..

5. Claims **23–26 are** rejected under 35 U.S.C. 103(a) as being unpatentable over **Hardgrove et al. (US 5,407,092)** in view of **Klenk et al. (US 2004/0038094 A1)** and further in view of **Faye et al. (US 2004/0033402 A1)**.

For claim 23, Hardgrove et al. modified as above does not disclose the cogeneration system comprising a fuel cell system. Faye et al. does disclose the cogeneration system comprising a fuel cell system according to claim 21.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the fuel cell system of Faye et al. with the apparatus of Hardgrove et al. modified as above to allow for an alternative way to power a vehicle creating a backup if the initial one fails.

For claim 24, Hardgrove et al. modified as above does not disclose the natural gas supply system comprising a natural gas pressure vessel and pressure piping for delivering natural gas from the pressure vessel therethrough, the natural gas pressure vessel being a pressure vessel according to claim 20. Faye et al. does disclose the natural gas supply system comprising a natural gas pressure vessel 2 and pressure piping for delivering natural gas from the pressure vessel therethrough, the natural gas pressure vessel being a pressure vessel according to claim 20.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the natural gas supply system of Faye et al. with the apparatus of Hardgrove et al. modified as above to allow for an alternative way to power a vehicle creating a backup if the initial one fails.

For claim 25, Kobayashi does not disclose the cogeneration system comprising a natural gas supply system according to claim 24, a generator and a generator drive device. Faye et al. does disclose the cogeneration system comprising a natural gas supply system according to claim 24, a generator and a generator drive device (engine) as stated in background of invention in page 2, paragraph [0025], lines 4 - 10.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the natural gas supply system of Faye et al. with the apparatus of Hardgrove et al. modified as above to allow for an alternative way to power a vehicle creating a backup if the initial one fails.

For claim 26, Hardgrove et al. modified as above does not disclose the natural gas motor vehicle comprising a natural gas supply system according to claim 24 and an engine for use with natural gas as a fuel. Faye et al. does disclose the natural gas motor vehicle comprising a natural gas supply system according to claim 24 and an engine for use with natural gas as a fuel as stated in background of invention in page 2, paragraph [0025], lines 4 - 10.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the natural gas supply system of Faye et al. with the apparatus of Hardgrove et al. modified as above to allow for an alternative way to power a vehicle creating a backup if the initial one fails.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to whose telephone number is 571-270-5576. The examiner can normally be reached on Monday to Thursday, 6:00 AM - 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lesley Morris can be reached on 571-272-6651. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JK/

April 1, 2010

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